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ABSTRACT

A physical layer protocol is added to retrieve the in-band downstream ADSL channel frequency response H(f), the noise N(f), measured at initialization and the signal to noise ratio SNR(f) measured at show time on a per bin basis. Additionally retrieval of similar in-band information may be provided in the upstream direction. The definition of the message protocol for retrieving during show time the following ATU-R information on a per bin basis: In-band channel frequency response per bin $H_R(f)$ measured during the initialization referred back to the receiver tip and ring copper pair by the ARU-R; In-band noise estimation per bin $N_R(f)$ during the initialization referred back to the receiver tip and ring copper pair by the ATU-R; and the signal-to-noise ratio per bin $SNR_R(f)$ during show time referred back to the receiver tip and ring copper pair by the ATU-R. The values of $SNR_R(f)$ should be updated as they change. An addition of the programming interface in the ADSL ATU-C chipset level makes similar information available for the upstream direction, that is $N_c(f)$, $N_c(f)$ and $SNR_C(f)$. Initialization H(f) can be used for analyzing the physical copper loop condition between tip and ring. Initialization N(f) can be used for analyzing the crosstalk. Showtime SNR(f) can be used for analyzing time dependent changes in crosstalk levels and line attenuation (such as due to moisture). The combination of H(f), N(f) and SNR(f) can be used for trouble shooting why the data rate cannot reach the maximum data rate of a given loop, scheduling maintenance and plant update.